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ABSTRACT

This paper describes a study of the effects of horseback riding on physically disabled adults. The first therapeutic riding centers were built during the late 1950s in Great Britain. Today, there are well over 350 accredited therapeutic riding centers in North America. Therapeutic riding is categorized into three areas: sport/recreation, medical, and education/psychology. While evidence of improved coordination, strength, and self-concept appears as a result of therapeutic horseback riding, scientific research and evidence of benefits is lacking. The current study used 15 physically disabled adults who were given tests before and after an 8-week therapeutic horseback riding program. Another group of 24 physically disabled adults, half of whom took part in the riding program, were given posttests only. The most noted disabilities in this study were head trauma, visual impairment, arthritis, cerebral palsy, and epilepsy. Participants were tested in self-concept, and in strength and coordination. Strength and coordination were measured using an electronic Strength and Coordination Instrument (SCI Model #1). Results showed improvement in coordination for subjects who participated in the riding program. No significant differences were found in self-concept or strength scores. The paper contains 38 references. (TES)

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THERAPY ON HORSEBACK:

PSYCHOMOTOR AND PSYCHOLOGICAL CHANGE IN PHYSICALLY DISABLED ADULTS

EXCERPTS FROM DISSERTATION RESEARCH

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"The best thing for the inside of a man
is the outside of a horse."

(Winston Churchill)

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EFFECT OF THERAPEUTIC HORSEBACK RIDING ON PHYSICALLY DISABLED ADULTS

Introduction

"Sit tall...ride on" are familiar words heard in hundreds of therapeutic horseback riding centers around the world. Riding 10 feet tall astride an animal known for speed, power, and beauty can be a memorable experience. When the rider has a disability, the accompanying wheelchair, crutches, and restrictive behaviors are left behind. Sitting tall and riding on may be much more than memorable for persons with limited abilities.

Horseback riding, considered "for the able-bodied only" has expanded to a medical, sport/recreation, and education/psychology orientation for persons with limited abilities. Used in easement of psychological stress and physical impairments, riding provides the means to control one's destiny, and allows mobility far beyond previous capability (Davies, 1983; Kuprian, 1984). In 1986, hundreds of therapeutic horseback riding centers were operating throughout the world in 25 countries, providing valuable service and therapy to an estimated 60,000 disabled individuals (J. Tebay, personal communication, October 31, 1986).

Need for the Study

There are well over 350 accredited therapeutic riding centers in North America today. In one year (1986), over 50 new centers were accredited with the North American Riding for the Handicapped Association (NARHA). Another professional organization, the National Foundation for Happy Horsemanship

for the Handicapped (HHFTH), with a less restrictive membership structure, turned no one down needing help in small scale or "backyard" horseback riding program. Hundreds of such programs exist, with similar goals and committed personnel. The interest and need for therapeutic riding programs is noteworthy.

Beneficial changes have occured in several case studies with disabled children following participation in horseback riding (Clarke, 1971; Curtis, 1981; Davies, 1983, Hunter-Warfel, 1983; Johnson, 1982; Kelman, 1985; McCowan, 1972; Morin, 1985; Rosin, 1980). However, very few research studies have been conducted with groups of disabled riders and even fewer studies involve disabled adults.

Funds to operate a new therapeutic riding center are readily available, with copious newspaper coverage and generous help from the local community. Consecutive years are often tough. When funding sources request "proof" that therapeutic benefits occur from riding horses, none exists. Well devised schedules, lesson plans, and an occasional published case-study have not provided a basis for grants or continued funding. There is inadequate empirical research to answer the queries of funding agencies. A literature review revealed the great need for research on the topic of therapeutic horseback riding.

Literature/Related Research

Instances of therapeutic horseback riding have been reported since the fifth century, B.C. (Chassaigne, 1870; Haskin, 1974; Peacock & Saywell, 1979), but the world's eyes opened when polio

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stricken Liz Hartel of Denmark won an Olympic Medal on her horse, Jubilee. Hartel continued riding after contracting polio in 1943 and left her wheelchair behind to win the Silver Medal in the prestigious Grand Prix de Dressage at the 1952 Olympic Games in Helsinki (Haskin, 1974).

The first therapeutic riding centers were built in the late 1950's in Great Britain upon inspiration by Ms. Hartel. By 1983, 540 programs were reported in Britain with 10 to 400 disabled riders (three-fourths children) in each program (Beiber, 1985). North America's involvement began in 1965 in Toronto, Canada under the leadership of Joseph J. Bauer, Dr. Renaud, and Dr. Fuelden. The Community Association for Riding for the Disabled (CARD) was a direct result of these efforts and a similar program began in Windsor, Ontario under direction of the Canadian Red Cross and Dr. Elmer Butt (Mayberry, 1978). In the United States, the National Foundation for Happy Horsemanship for the Handicapped, Inc. (HHFTH) was established in 1967 with headquarters in Malvern, Pennslyvania. The Cheff Center for the Handicapped in Michigan, followed in 1970 as the first "purposely built" center for therapeutic horseback riding.

Therapeutic riding is categorized into three areas of medical, sport/recreation, and education/psychology. Medical use of the horse's back (hippotherapy) purports to benefit posture, musculature, spastic and hypotonic conditions (Angier, 1983; Bausenwein, 1982; Freeman, 1984; Glasow, 1986; Gottwald & Biewald, 1982; Heipertz, 1984; Kuprian, 1984; Peacock & Saywell,

1979; Riede, 1986; Rosin, 1980; Strauss, 1984; Tauffkirchen, 1982). Horseback riding as sport and recreation is reported to assist in the development of balance, skill, coordination, and strength (Fox, Lawlor & Luttges, 1983; Glasow, 1985; Hall, Hulac & Myers, 1983; Joswick, Kittredge, McCowan, McParland & Woods, 1986; Kelman, 1985; Lamarre, 1985; Small, 1984; Smalley, 1975; Timms, 1983; Williams, 1984; Wingate, 1980). Riding as a psychological and educational tool appears to improve vocabulary, behavior, self confidence, motivation, and locus of control (Carlson, 1983; Curtis, 1981; Dismuke, 1984; Douglas, 1982; Funabiki, Carey & Myers, 1982; Kittredge, 1981; Phillips, 1985; Ringbeck, 1982; Rosenthal, 1975; Timms, 1983).

Few actual research studies have been conducted to verify benefits of therapeutic riding. According to the literature, the average number of subjects involved in each study was eight. Researchers were often forced to use subjective judgement for psychological evaluations and only one study utilized a scientific measuring instrument for the psychomotor evaluations. Subjectivity often hindered evaluations (Hall, Hulac & Myers, 1983; Glasow, 1985; Phillips, 1985; Rosenthal, 1975).

The lack of accurate psychomotor measuring instruments presented constant problems in therapeutic horseback riding research. In an attempt to solve this problem, a novel test instrument was designed by Fox, Lawlor, and Luttges (1983) for use at the Colorado Therapeutic Riding Center, Inc. The instrument recorded improvement in motor output systems of

disabled children after riding lessons. Data analysis included balance, coordination, strength, posture, and psychological scales. Each rider manipulated a symmetric balance beam affixed to an aluminum base and output from the beam was recorded on a Esterline-Angus 575 X-Y recorder (Fox, Lawlor, & Luttges, 1984).

In the posttest results, balance, coordination, arm and leg strength, straighter posture, and less spinal curvature resulted. No significance tests were conducted, however authors reported an overal 30% improvement in psychomotor functions of subjects.

Summary

The 1980's have been a time for growth and development of therapeutic horseback riding centers. Evidence of improved coordination, strength, and self-concept appears as a result of therapeutic horseback riding, however, significant scientific evidence of benefits due to riding is lacking. Researchers face two vast problems: longitudinal research is expensive (involving stable, arena, horses, boarding, shoeing, paid staff, etc.); and precise scientific measuring instruments for psychomotor and psychological functions are rare.

With the growing interest in therapeutic riding and the lack of scientific evidence in mind, the author conducted an empirical study with scientific instruments to measure the effect of horseback riding on physically disabled adults. The need for more understanding among health, recreation, and education professionals, private and public agencies is vital for the therapeutic riding center to survive and thrive.

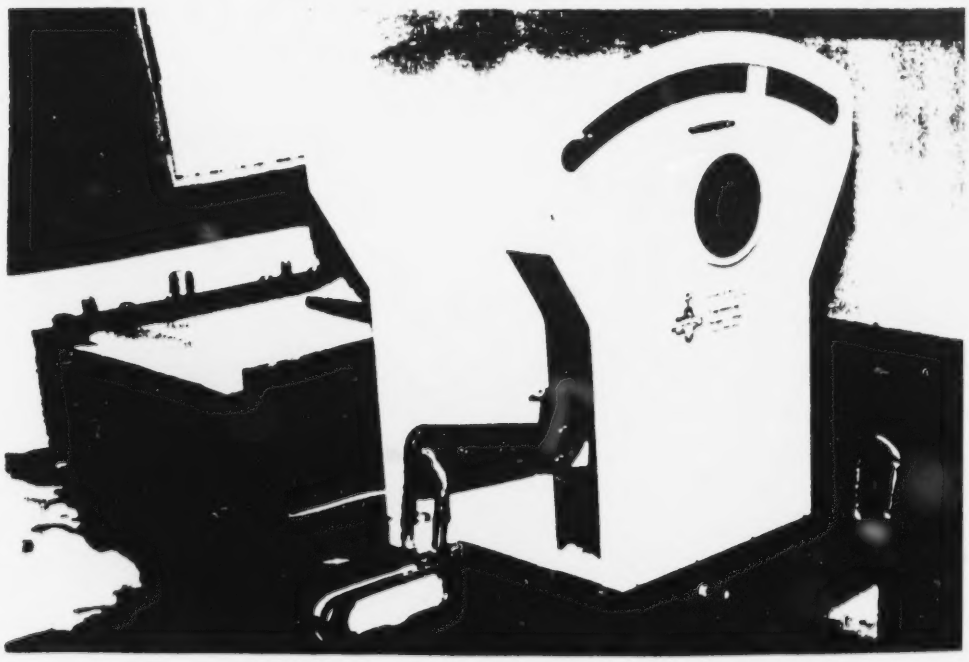
Methods and Procedures

Two research designs were used in this study: a Pre/Posttest Design using 15 physically disabled adults who were given tests before and after the eight week therapeutic horseback riding program; and a Posttest Only Design involving 24 physically disabled adults randomly assigned to a riding or non-riding group who were given posttests following the eight week program. Age of participants ranged from 19 to 41 years of age. The most noted disabilities in this study were head trauma, visual impairment, arthritis, cerebral palsy, and epilepsy. No subject missed more than three riding lessons, therefore a 100% retention rate of subjects occurred.

Classes in horseback riding were offered twice per week for eight weeks. The mid-week class was 60 minutes in length and the weekend class was 90-120 minutes in length. A riding instructor, two assistants, a physicaly therapist and over 150 volunteers were involved in each eight week session.

Numerous testing instruments were available for the measurement of self-concept. The Tennessee Self-Concept Scale was chosen for it's versatility and reliability. It was applicable to the whole range of psychological adjustment from healthy, well-adjusted people to psychotic patients. The test-retest reliability coefficient for the total positive or P score (utilized in this study) was .92. Validity was assessed by noting comparisons of the scores on the Tennessee Self-Concept Scale to other measures of self-concept.

Obtaining a device for psychomotor measures was difficult. A great concern in therapeutic horseback riding has been the lack of continuity in reliable psychomotor instruments. One past research study utilized a novel instrument designed and built to objectively quantify the effectiveness of therapeutic horseback riding. The instrument was an "aid in both diagnosis and measurement of motor system characteristics" (Fox, Lawlor & Luttges, 1984, pp. 36). Details of the device were obtained by the researcher and permission granted to build the instrument. This Strength and Coordination Instrument, or SCI Model #1 (see Figure 1), was redesigned with adaptations for adult riders.



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NOTE: The SCI Model #1 was built by faculty and students from the Departments of Mechanical and Electrical Engineering at Washington State University. The Partnership in Equine Therapy and Education program (PETE) provided funds for materials.

A symmetrical steel bar pivoted around a solid base as the basic component. When testing for arm coordination, reins were attached to either end of the bar and subjects sat facing the instrument with reins in hand. Each was given 10 seconds to manipulate the freely pivoting bar into a horizontal position. For leg coordination, stirrups were attached to either end of the machine and subjects followed the same procedure. To test strength, a heavy spring was locked to either side of the bar, holding the bar stationary. For arm strength, a stirrup was attached to the bar and subject was asked to press their hand down on the stirrup for 10 seconds. For leg strength, a stirrup with strap was attached to the bar and subject was asked to press their foot down on the stirrup for 10 seconds.

The balance beam translated movements of a subject's arm or leg into variations of electrical resistance. A Hewlett-Packard X-Y Digital plotter was attached to the instrument via an EIA connector 25 pin D-shell. The plotter received digitized signals from the SCI Model #1 and translated displacement of the symmetrical balance beam into plots of time vs. displacement on large graph paper. Feedback in the form of light, sound, and a graph aided subjects with visual or auditory impairments.

The graph paper was calibrated with lines to record the displacement of the bar in pounds (strength) and distance (coordination). One hundred tests were used to determine the line location and to measure the accuracy and reliability of the instrument.

Statistical analysis

Analysis of variance (ANOVA) was conducted on all scores in both research designs for self-concept, coordination, and strength. A .05 level of significance was selected.

Findings and Conclusions

Results of the analysis of the Pre/Post design depicted significance at $p < .01$ level for both arm and leg coordination and the Post Only design yielded significance at the $p < .01$ level for arm coordination. Improvement in coordination existed for subjects who participated in an eight-week twice per week therapeutic horseback riding program. The use of therapeutic riding in recreation and rehabilitation may assist the disabled individual in developing coordination skills, thus increasing competency in many areas of the disabled adult's life.

Figures 2-4 show the group means for the Pre/Post and Post-Only research designs of each psychological and psychomotor test.

Figure 2

Group Means of P Scores for Experimental Study and Pilot Study Subjects

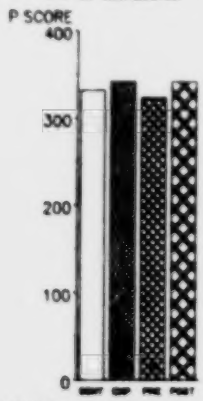


Figure 3

Group Means of Coordination Scores For Experimental Study and Pilot Study Subjects

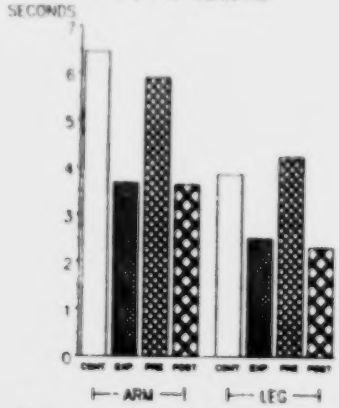
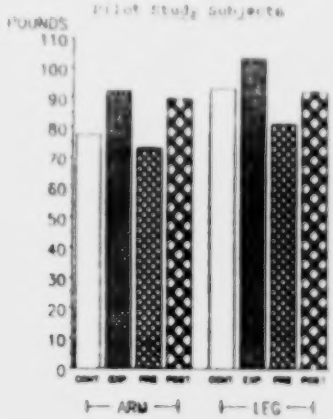


Figure 4

Group Means of Strength Scores for Experimental Study and Pilot Study Subjects



NOTE: Cont = control; Exp = experimental; Pre = pretest; Post = posttest. Coordination comparisons: less seconds = better coordination.

One can note improved scores in group means, however, no significant differences were found in self-concept or strength scores. Two possible explanations follow:

1) Self-concept has not yet been reported with statistically significant change during a therapeutic horseback riding program (Brock, 1987; Carlson, 1983; Dismuke, 1983). It is difficult to detect a change in self-concept in less than a period of six months -- and even more difficult to detect a change in adults (Carlson, 1983; Rosenthal, 1975). Research extended over a year with subjects regularly involved with riding is recommended to detect a change in self-concept.

2) Strength testing for persons inclined to spasticity may be inaccurate. These individuals may involuntarily resist an opposite force (B. Stanford, personal communication, November 15, 1986). Many subjects in this research were affected with cerebral palsy, epilepsy, or severe head injury, thus the recorded measures may not have represented their true strength. The use of alternative instruments for measures of strength may be necessary for persons with an inclination to spasticity.

Conclusions

The development of coordination in physically disabled adults occurred after involvement with an eight week, twice per week program of therapeutic horseback riding. Dr. Detlev Riede, a senior physician at the Orthopedic Clinic at Martin Luther University in Germany and an expert on medical benefits of horseback riding, concurs. Riede stated, "the horse's back has proven itself irreplaceable for coordination training as part of

a complex kinesitherapy treatment" (Kiede, 1986, pp. 7).

An interesting observation in this research was the change in social/emotional behavior during the therapeutic riding program. Personal interaction among riders and volunteers existed where none did before; friendships were made and retained; and participants seemed to look forward to each therapy session. Volunteers interacted with the riders as "horse-lovers", forgetting their disabilities and some became involved with white-water rafting, skiing, and swimming programs for disabled persons. Therapeutic horseback riding provided one of those rare and realistic situations where interchange with able-bodied peers occured "beyond the school yard fence."

Recommendations

Longitudinal study on the development and improvement of coordination, specifically, during programs of therapeutic horseback riding is recommended. Measurement of attitude change or socialization skills of both able-bodied and disabled participants may also result in some interesting information. Finally, in order to have a more homogeneous population, perhaps groups of persons with similar disabilities should be randomly assigned to a riding or non riding situation.

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